IN THE CLAIMS:

Please cancel Claims 2 and 8 without prejudice to or disclaimer of the recited subject matter.

Please amend Claims 1, 3-7, 9-14 , 19, 25, 27, 29, 31, 33, 35, and 37 and add new Claims 81-84 as follows.

1. (Currently Amended) A ~~Method~~ method of inserting a supplementary information item (S)~~, such as a secret watermark,~~ in digital data (I), characterized in that it includes the following steps:

- multi-resolution spectral breakdown (E1) of the digital data <u>at a level (d) predetermined so that a number (n) of components of lowest frequency is between 8x8 and 32x32</u>;

- extraction (E2) of the components of lowest frequency;

- choice (E3) of a subset of the components of lowest frequency;

- modulation (E4) of the components of said subset in order to insert the supplementary information (S); and

-reverse multi-resolution spectral recomposition (E5) of the watermarked digital data (I').

2. (Cancelled)

3. (Currently Amended) Insertion method according to ~~one of Claims 1 or 2~~ Claim 1, characterized in that, at the spectral breakdown step (E1), the spectral breakdown is performed by a discrete wavelet transformation and, at the extraction step (E2), the components of the approximation sub-band (LL) are chosen.

4. (Currently Amended) Insertion method according to ~~one of Claims 1 or 2~~ Claim 1, characterized in that, at the spectral breakdown step (E1), the digital data (I) are broken down iteratively into an approximation version corresponding to a low-pass filtering and a sub-sampling of the digital data or of a previous approximation version, and into a detail version corresponding to the subtraction of the approximation version from the digital data or from said previous approximation version, and, at the extraction step (E2), the components of the approximation version are chosen.

5. (Currently Amended) Insertion method according to ~~one of Claims 1 or 2~~ Claim 1, characterized in that, at the modulation step (E4), the components of said subset are modulated by adding a modulation value (w_k) generated by a pseudo-random function initialized by a digital signal (S) representing the supplementary information to be inserted.

6. (Currently Amended) Insertion method according to ~~one of Claims 1 or 2~~ Claim 1, characterized in that, at the choosing step (E3), the subset of components is chosen according to a pseudo-random function initialized by a digital signal (K) representing a confidential key associated with the supplementary information (S) to be inserted.

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7. (Currently Amended) ~~Device~~ A device for inserting a supplementary information item (S)~~, such as a secret watermark,~~ in digital data (I), characterized in that it has:

-means (11) for the multi-resolution spectral breakdown of the digital data (I) <u>at a level (d) predetermined so that a number (n) of components of lowest frequency is between 8x8 and 32x32</u>;

- extraction means (12) adapted to extract components of lowest frequency;

- choosing means (13) for choosing a subset of the components of lowest frequency;

- means (14) of modulating the components of said subset in order to insert the supplementary information (S); and

- means (15) for the reverse multi-resolution spectral recomposition of the watermarked digital data (I').

8. (Cancelled)

9. (Currently Amended) Insertion device according to ~~one of Claims 7 or 8~~ <u>Claim 7</u>, characterized in that the multi-resolution spectral breakdown means (11) are adapted to perform a discrete wavelet transformation, the extraction means (12) being adapted to choose the components of the approximation sub-band (LL).

10. (Currently Amended) Insertion device according to ~~one of Claims 7 or 8~~ <u>Claim 7</u>, characterized in that the multi-resolution spectral breakdown means (11) are adapted to

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break down the digital data (I) iteratively into an approximation version corresponding to a low-pass filtering and a sub-sampling of the digital data or of a previous approximation version, and into a detail version corresponding to the subtraction of the approximation version from the digital data or from said previous approximation version, the extraction means (12) being adapted to choose the components of the approximation version.

11. (Currently Amended) Insertion device according to ~~one of Claims 7 or 8~~ Claim 7, characterized in that the modulation means (14) cooperate with a generator (16) of modulation values (w_k) generated by a pseudo-random function initialized by a digital signal (S) representing the supplementary information to be inserted and having means (15) of adding the modulation values (w_k) to the components of said subset.

12. (Currently Amended) Insertion device according to ~~one of Claims 7 or 8~~ Claim 7, characterized in that the choosing means (13) for choosing a subset of components cooperate with a generator (16) generating numbers (b_k) according to a pseudo-random function initialized by a digital signal (K) representing a confidential key associated with the supplementary information (S) to be inserted.

13. (Currently Amended) Insertion device according to ~~one of Claims 7 or 8~~ Claim 7, characterized in that the means of spectral breakdown (11), extraction (12), choosing (13), modulation (14) and spectral recomposition (15) are incorporated in:

- a microprocessor (10);

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- a read-only memory (102) containing a program for inserting a supplementary information item (S); and

- a random access memory (103) containing registers adapted to record variables modified during the running of the program.

14. (Currently Amended) ~~Method~~ A method of decoding, in watermarked digital data (I*), a supplementary information item (S), ~~such as a secret watermark~~, inserted in initial digital data (I) according to the insertion method according to Claim 1, characterized in that it includes the following steps:

- multi-resolution spectral breakdown (E6) of the watermarked digital data (I*) and initial digital data (I) <u>at a level (d) predetermined so that a number (n) of components of lowest frequency is between 8x8 and 32x32</u>;

- extraction (E7) of the components of lowest frequency in the watermarked (I*) and initial digital data (I);

- selection (E8) of the subset of components chosen at the choosing step (E3) of said method of insertion in the watermarked (I*) and initial digital data (I);

- estimating (E9), by subtraction respectively of the components of said subset of watermarked digital data (I*) from the components of said subset of initial digital data (I), an estimated sequence (W*) of modulation values;

- generation (E10) of a presupposed sequence (W) of modulation values inserted at the modulation step (E4) of said insertion method;

-calculation (E11) of a correlation value between the estimated sequence (W*) and the presupposed sequence (W); and

-decision (E12) on the similarity or otherwise of the estimated sequence (W*) and presupposed sequence (W) as a function of said correlation value.

15. (Original) Decoding method according to Claim 14, characterized in that, at the spectral breakdown step (E6), the spectral breakdown is effected by a discrete wavelet transformation and, at the extraction step (E7), the components of the approximation sub-band (LL) are chosen.

16. (Original) Decoding method according to Claim 14, characterized in that, at the spectral breakdown step (E6), the initial digital data (I) and watermarked digital data (I*) are broken down iteratively into an approximation version corresponding to a low-pass filtering and a sub-sampling of the digital data or of a previous approximation version, and into a detail version corresponding to the subtraction of the approximation version from the digital data or from said previous approximation version, and in that, at the extraction step (E7), the components of the approximation version are chosen.

17. (Original) Decoding method according to one of Claims 14 to 16, characterized in that, at the generation step (E10), the presupposed sequence (W) of modulation values is generated by a pseudo-random function initialized by a digital signal (S) representing the supplementary information to be decoded.

18. (Previously Amended) Decoding method according to one of Claims 14 to 16, characterized in that, at the selection step (E8), the subset of components is chosen according to a pseudo-random function initialized by a digital signal (K) representing a confidential key associated with the supplementary information (S) to be decoded.

19. (Currently Amended) ~~Device~~ A device for decoding, in watermarked digital data (I*), a supplementary information item (S), ~~such as a secret watermark,~~ inserted in initial digital data (I) according to the insertion method according to Claim 1, characterized in that it has:

- means (61) of multi-resolution spectral breakdown of the watermarked digital data (I*) and initial digital data (I) <u>at a level (d) predetermined so that a number (n) of components of lowest frequency is between 8x8 and 32x32</u>;

- means (62) of extraction of the components of lowest frequency in the watermarked (I*) and initial digital data (I);

- means (63) of selection of the subset of components chosen at the choosing step (E3) of said method of insertion in the watermarked (I*) and initial digital data (I);

- means (64) of estimating, by subtraction respectively of the components of said subset of watermarked digital data (I*) from the components of said subset of initial digital data (I), an estimated sequence (W*) of modulation values;

- means (65) of generating a presupposed sequence (W) of modulation values inserted at the modulation step (E4) of said insertion method;

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- means (67) of calculating a correlation value between the estimated sequence (W*) and the presupposed sequence (W); and

- means (68) of deciding on the similarity or otherwise of the estimated sequence (W*) and of the presupposed sequence (W) as a function of said correlation value.

20. (Original) Decoding device according to Claim 19, characterized in that the spectral breakdown means (61) are adapted to perform a discrete wavelet transformation, the extraction means (62) being adapted to choose the components of the approximation sub-band (LL).

21. (Original) Decoding device according to Claim 19, characterized in that the spectral breakdown means (61) are adapted to break down the initial digital data (I) and watermarked digital data (I*) iteratively into an approximation version corresponding to a low-pass filtering and a sub-sampling of the digital data or of a previous approximation version, and into a detail version corresponding to a subtraction of the approximation version from the digital data or from the said previous approximation version, the extraction means (62) being adapted to choose the components of the approximation version.

22. (Original) Decoding device according to one of Claims 19 to 21, characterized in that the means (65) of generating the presupposed sequence (W) of modulation values cooperate with a generator (66) generating modulation values generated by a

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pseudo-random function initialized by a digital signal (S) representing supplementary information to be decoded.

23. (Previously Amended) Decoding device according to one of Claims 19 to 21, characterized in that the selection means (63) cooperate with a generator (66) generating numbers (b_k) in accordance with a pseudo-random function initialized by a digital signal (K) representing a confidential key associated with the supplementary information (S) to be decoded.

24. (Previously Amended) Decoding device according to one of Claims 19 to 21, characterized in that the means of spectral breakdown (61), extraction (62), selection (63), estimation (64), generation (65), calculation (67) and decision (68) are incorporated in:

- a microprocessor (10);

- a read-only memory (102) containing a program for decoding a supplementary information item (S); and

-a random access memory (103) containing registers adapted to record variables modified during the running of the program.

25. (Currently Amended) Digital signal processing apparatus, characterized in that it has an insertion device according to ~~one of Claims 7 or 8~~ Claim 7.

26. (Previously Amended) Digital signal processing apparatus, characterized in that it has a decoding device according to one of Claims 19 to 21.

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27. (Currently Amended) Digital photographic apparatus, characterized in that it has an insertion device according to ~~one of Claims 7 or 8~~ Claim 7.

28. (Previously Amended) Digital photographic apparatus, characterized in that it has a decoding device according to one of Claims 19 to 21.

29. (Currently Amended) Digital camera, characterized in that it has an insertion device according to ~~one of Claims 7 or 8~~ Claim 7.

30. (Previously Amended) Digital camera, characterized in that it has a decoding device according to one of Claims 19 to 21.

31. (Currently Amended) Database management system, characterized in that it has an insertion device according to ~~one of Claims 7 or 8~~ Claim 7.

32. (Previously Amended) Database management system, characterized in that it has a decoding device according to one of Claims 19 to 21.

33. (Currently Amended) Computer, characterized in that it has an insertion device according to ~~one of Claims 7 or 8~~ Claim 7.

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34. (Previously Amended) Computer, characterized in that it has a decoding device according to one of Claims 19 to 21.

35. (Currently Amended) Scanner, characterized in that it has an insertion device according to ~~one of Claims 7 or 8~~ Claim 7.

36. (Previously Amended) Scanner, characterized in that it has a decoding device according to one of Claims 19 to 21.

37. (Currently Amended) Medical imaging apparatus, and notably an X-ray radiography apparatus, characterized in that it has an insertion device according to ~~one of Claims 7 or 8~~ Claim 7.

38. (Previously Amended) Medical imaging apparatus, and notably an X-ray radiography apparatus, characterized in that it has a decoding device according to one of Claims 19 to 21.

39. (Original) Method of inserting a supplementary information item (S), such as a secret watermark, in digital data (I), characterized in that it includes the following steps:

- multi-resolution spectral breakdown (E101) of the digital data (I);

- extraction (E102) of the components of a frequency sub-band (LL);

- spectral transformation (E103) of the components of said frequency sub-band (LL);

-choice (E104) of a subset of coefficients (X_k) of said spectral transformation;

- modulation (E105) of the coefficients (X_k) of said subset in order to insert the supplementary information (S);

- reverse spectral transformation (E106) of the coefficients including the subset of modulated coefficients (X_k); and

- reverse multi-resolution spectral recomposition (E107) of the watermarked digital data (I').

40. (Original) Insertion method according to Claim 39, characterized in that, during the extraction step (E102), the components of the sub-band with the lowest frequency (LL) are chosen.

41. (Original) Insertion method according to one of Claims 39 or 40, characterized in that, at the spectral breakdown step (E101), the spectral breakdown is effected by a discrete wavelet transformation, and, at the extraction step (E102), the components of the approximation sub-band (LL) are chosen.

42. (Original) Insertion method according to Claim 41, characterized in that the level of breakdown by the wavelet transformation is predetermined so that the member (n) of components of the approximation sub-band (LL) is between 8 x 8 and 32 x 32.

43. (Previously Amended) Insertion method according to one of Claims 39 or 40, characterized in that the spectral transformation is a discrete cosine transformation.

44. (Previously Amended) Insertion method according to one of Claims 39 or 40, characterized in that, at the modulation step (E105), the coefficients (X_k) of said subset are modulated by adding a modulation value (X_k) generated by a pseudo-random function initialized by a digital signal (S) representing the supplementary information to be inserted.

45. (Previously Amended) Insertion method according to one of Claims 39 or 40, characterized in that, at the choosing step (E104), the subset of coefficients (X_k) is chosen according to a pseudo-random function initialized by a digital signal (K) representing a confidential key associated with the supplementary information (S) to be inserted.

46. (Original) Device for inserting a supplementary information item (S), such as a secret watermark, in digital data (I), characterized in that it has:

-means (31) for the multi-resolution spectral breakdown of the digital data (I);

- extraction means (32) adapted to extract components of a frequency sub-band (LL); - means (33) for the spectral transformation of the components of said frequency sub-band (LL);

- choosing means (34) for choosing a subset of coefficients (X_k) of said spectral transformation;

- means (35) of modulating the coefficients (X_k) of said subset in order to insert the supplementary information (S);

- means (36) for the reverse spectral transformation of the coefficients including the subset of modulated coefficients (X_k); and

- means (37) for the reverse multi-resolution spectral recomposition of the watermarked digital data (I').

47. (Original) Insertion device according to Claim 46, characterized in that the extraction means (32) for extracting a frequency sub-band are adapted to choose the components of the sub-band with the lowest frequency (LL).

48. (Original) Insertion device according to one of Claims 46 or 47, characterized in that the multi-resolution spectral breakdown means (31) are adapted to perform a discrete wavelet transformation, the extraction means (32) being adapted to choose the components of the approximation sub-band (LL).

49. (Original) Insertion device according to Claim 48, characterized in that the breakdown number (d) for the wavelet transformation is predetermined so that the number (n) of components of the approximation sub-band (LL) is between 8 x 8 and 32 x 32.

50. (Previously Amended) Insertion device according to one of Claims 46 or 47, characterized in that the spectral transformation means (33) are adapted to effect a discrete cosine transform.

51. (Previously Amended) Insertion device according to one of Claims 46 or 47, characterized in that the modulation means (35) cooperate with a generator (38) of modulation values (w_k) generated by a pseudo-random function initialized by a digital signal (S) representing the supplementary information to be inserted and having means (35) of adding the modulation values (w_k) to the coeffficients (X_k) of said subset.

52. (Previously Amended) Insertion device according to one of Claims 46 or 47, characterized in that the choosing means (34) for choosing a subset of coefficients (X_k) cooperate with a generator (38) of numbers (b_k) according to a pseudo-random function initialized by a digital signal (K) representing a confidential key associated with the supplementary information (S) to be inserted.

53. (Previously Amended) Insertion device according to one of Claims 46 or 47, characterized in that the means of spectral breakdown (31), extraction (32), spectral transformation (33) choosing (34), modulation (35), reverse spectral transformation (36) and spectral recomposition (37) are incorporated in:

- a microprocessor (10),

-a read-only memory (102) containing a program for inserting a supplementary information item (S), and

-a random access memory (103) containing registers adapted to record variables modified during the running of the program.

54. (Previously Amended) Method of decoding, in watermarked digital data (I*), a supplementary information item (S), such as a secret watermark, inserted in initial digital data (I) according to an insertion method according to Claim 39, characterized in that it includes the following steps:

-multi-resolution spectral breakdown (E110) of the watermarked digital data (I*) and initial digital data (I);

- extraction (E111) of the components of a sub-band of frequencies (LL) respectively in the watermarked (I*) and initial (I) digital data;

- spectral transformation (E112) of the components of the frequency sub-band (LL) of the watermarked digital data (I*) and initial digital data (I).

- selection (E113) of the subset of coefficients chosen at the choosing step (E104) of said method of insertion in the watermarked digital data (I*) and initial digital data (I);

- estimating (E114), by subtraction respectively of the coefficients of said subset of watermarked digital data (I*) from the coefficients of said subset of initial digital data (I), an estimated sequence (W*) of modulation values;

- generation (E115) of a presupposed sequence (W) of modulation values inserted at the modulation step (E105) of said insertion method;

- calculation (E116) of a value of correlation between the estimated sequence (W*) and the presupposed sequence (W); and

-deciding (E117) on the similarity or otherwise of the estimated sequence (W*) and presupposed sequence (W) as a function of said correlation value.

55. (Original) Decoding method according to Claim 54, characterized in that, during the extraction step (E111), the components of the sub-band with the lowest frequency (LL) are chosen.

56. (Original) Decoding method according to one of Claims 54 or 55, characterized in that, at the spectral breakdown step (E110), the spectral breakdown is effected by means of a discrete wavelet transformation and, at the extraction step (E111), the components of the approximation sub-band (LL) are chosen.

57. (Previously Amended) Decoding method according to one of Claims 54 or 55, characterized in that the spectral transformation is a discrete cosine transform.

58. (Previously Amended) Decoding method according to one of Claims 54 or 55, characterized in that, at the generation step (E115), the presupposed sequence (W) of modulation values is generated by means of a pseudo-random function initialized by a digital signal (S) representing the supplementary information to be decoded.

59. (Previously Amended) Decoding method according to one of Claims 54 or 55, characterized in that, at the selection step (E113), the subset of coefficients is chosen according to a pseudo-random function initialized by a digital signal (K) representing a confidential key associated with the supplementary information (S) to be decoded.

60. (Previously Amended) Device for decoding, in watermarked digital data (I*), a supplementary information item (S), such as a secret watermark. inserted in initial digital data (I) according to an insertion method in accordance with Claim 39, characterized in that it has:

- means (21) of multi-resolution spectral breakdown of the watermarked digital data (I*) and initial digital data (I);

- means (22) of extraction of the components of a sub-band of frequencies (LL) respectively in the watermarked (I*) and initial (I) digital data;

- means (23) for the spectral transformation of the components of the frequency sub-band (LL) of the watermarked digital data (I*) and initial digital data (I);

- means (24) of selection of the subset of coefficients chosen at the choosing step (E104) of said method of insertion in the watermarked (I*) and initial (I) digital data;

- means (25) of estimating, by subtraction respectively of the coefficients of said subset of watermarked digital data (I*) from the coefficients of said subset of initial digital data (I), an estimated sequence (W*) of modulation values;

- means (26) of generating a presupposed sequence (W) of modulation values inserted at the modulation step (E105) of said insertion method;

- means (28) of calculating a value of correlation between the estimated sequence (W*) and the presupposed sequence (W); and

- means of deciding (29) on the similarity or otherwise of the estimated sequence (W*) and of the presupposed sequence (W) as a function of said correlation value.

61. (Original) Decoding device according to Claim 60, characterized in that the extraction means (22) are adapted to choose the components of the sub-band with the lowest frequency (LL).

62. (Original) Decoding device according to one of Claims 60 or 61, characterized in that the multi-resolution spectral breakdown means (21) are adapted to effect a discrete wavelet transformation, the extraction means (22) being adapted to choose the components of the approximation sub-band (LL).

63. (Previously Amended) Decoding device according to one of Claims 60 or 61, characterized in that the spectral transformation means (23) are adapted to effect a discrete cosine transform.

64. (Previously Amended) Decoding device according to one of Claims 60 or 61, characterized in that the generation means (26) cooperate with a generator (27) of modulation values generated by means of a pseudo-random function initialized by a digital signal (S) representing the supplementary information to be decoded

65. (Previously Amended) Decoding device according to one of Claims 60 or 61, characterized in that the selection means (24) cooperate with a generator (27) of numbers (bk) in accordance with a pseudo-random function initialized by a digital signal (K) representing a confidential key associated with the supplementary information (S) to be decoded.

66. (Previously Amended) Decoding device according to one of Claims 60 or 61, characterized in that the means of spectral breakdown (21), extraction (22), spectral breakdown (23), selection (24), estimation (25), generation (26), calculation (28) and decision (29) are incorporated in:

- a microprocessor (10),

- a read-only memory (102) containing a program for decoding a supplementary information item (S), and

- a random access memory (103) containing registers adapted to record variables modified during the running of the program.

67. (Previously Amended) Digital signal processing apparatus, characterized in that it has an insertion device according to one of Claims 46 or 47

68. (Previously Amended) Digital signal processing apparatus, characterized in that it has a decoding device according to one of Claims 60 or 61

69. (Previously Amended) Digital photographic apparatus, characterized in that it has an insertion device according to one of Claims 46 or 47.

70. (Previously Amended) Digital photographic apparatus, characterized in that it has a decoding device according to one of Claims 60 or 61.

71. (Previously Amended) Digital camera, characterized in that it has an insertion device according to one of Claims 46 or 47.

72. (Previously Amended) Digital camera, characterized in that it has a decoding device according to one of Claims 60 or 61.

73. (Previously Amended) Database management system, characterized in that it has an insertion device according to one of Claims 46 or 47.

74. (Previously Amended) Database management system, characterized in that it has a decoding device according to one of Claims 60 or 61.

75. (Previously Amended) Computer, characterized in that it has an insertion device according to one of Claims 46 or 47.

76. (Previously Amended) Computer, characterized in that it has a decoding device according to one of Claims 60 or 61.

77. (Previously Amended) Scanner, characterized in that it has an insertion device according to one of Claims 46 or 47.

78. (Previously Amended) Scanner, characterized in that it has a decoding device according to one of Claims 60 or 61.

79. (Previously Amended) Medical imaging apparatus, and notably an X-ray radiography apparatus, characterized in that it has an insertion device according to one of Claims 46 or 47.

80. (Previously Amended) Medical imaging apparatus, and notably an X-ray radiography apparatus, characterized in that it has a decoding device according to one of Claims 60 or 61.

81. (New) Insertion method according to Claim 1, further comprising a step of transformation using a Discrete Cosine Transform of the components of lowest frequency.

82. (New) Insertion device according to Claim 7, further comprising means adapted to effect a Discrete Cosine Transform of the components of lowest frequency.

83. (New) Decoding method according to Claim 14, further comprising a step of transformation using a Discrete Cosine Transform of the components of lowest frequency in the watermark (I*) and initial digital data(I).

84. (New) Decoding device according to Claim 19, further comprising means adapted to effect a Discrete Cosine Transform of the components of lowest frequency in the watermark (I*) and initial digital data (I).